

WHAT IS CLAIMED IS:

1. A ball bearing comprising:

an outer ring including on the inner peripheral surface thereof an outer ring raceway having an arc-shaped section, said outer ring raceway being formed on a center projecting portion having a diameter which is smaller than the diameters of opposite end portions of the inner peripheral surface in the axial direction of said outer ring;

an inner ring including on the outer peripheral surface thereof an inner ring raceway having an arc-shaped section; and

a plurality of balls respectively interposed rollably between said outer and inner ring raceways,

wherein, where the outside diameter of said outer ring is expressed as D , the inside diameter of said inner ring is expressed as d , the pitch circle diameter of said respective balls is expressed as D_p , the following equations (1), (2), (3) and (4) can be satisfied:

$$(1) \quad x = D_b / \{ (D - d) / 2 \},$$

$$(2) \quad y = D_p / \{ (D + d) / 2 \},$$

$$(3) \quad x \geq 0.3, \text{ and}$$

$$(4) \quad y < 1.0.$$

2. The ball bearing according to claim 1, further comprising a sealed ring disposed on one of said end portions, and a hold recessed portion disposed axially between said sealed ring and said center projecting portion.

3. The ball bearing according to claim 1, wherein, where the diameter of said respective balls is expressed as D_b , the radius of curvature of the section shape of said outer ring raceway is expressed as R_o , and the radius of curvature of the section shape of said inner ring raceway is expressed as R_i , the following equations (5) and (6) can be satisfied:

$$(5) \quad 0.53 < R_o / D_b \leq 0.65, \text{ and}$$

$$(6) \quad 0.52 < R_i / D_b \leq 0.65,$$

to thereby make the rotation torque of the ball bearing lower and also prevent the Brinell impression from generating.

4. The ball bearing according to claim 1, wherein said outer ring, said inner ring and said balls are made of bearing steel.

5. The ball bearing according to claim 1, wherein the value of y is set equal to or less than 0.95.

6. The ball bearing according to claim 1, wherein the value of y is set equal to or less than 0.9.

7. A ball bearing comprising:

an outer ring including on the inner peripheral surface thereof an outer ring raceway having an arc-shaped cross section, wherein said arc-shaped section has a constant radius over its length;

an inner ring including on the outer peripheral surface thereof an inner ring raceway having an arc-shaped cross section; and

a plurality of balls respectively interposed rollably between said outer and inner ring raceways,

wherein, where the outside diameter of said outer ring is expressed as D, the inside diameter of said inner ring is expressed as d, the pitch circle diameter of said respective balls is expressed as Dp, the following equations (1), (2), (3) and (4) can be satisfied:

$$(1) \quad x = D_b / \{ (D - d) / 2 \},$$

$$(2) \quad y = D_p / \{ (D + d) / 2 \},$$

$$(3) \quad x \geq 0.3, \text{ and}$$

$$(4) \quad y < 1.0, \text{ and}$$

further wherein, where the diameter of said respective balls is expressed as D_b, the radius of curvature of the section shape of said outer ring raceway is expressed as R_o, and the radius of curvature of the section shape of said inner ring raceway is expressed as R_i, the following equations (5) and (6) can be satisfied:

$$(5) \quad 0.53 < R_o / D_b \leq 0.65, \text{ and}$$

$$(6) \quad 0.52 < R_i / D_b \leq 0.65,$$

to thereby make the rotation torque of the ball bearing lower and also prevent the Brinell impression from generating.

8. The ball bearing according to claim 7, wherein said outer ring raceway is formed on a center projecting portion having a diameter which is smaller than the diameters of opposite end portions of the inner peripheral surface in the axial direction of said outer ring.

9. The ball bearing according to claim 8, further comprising a sealed ring disposed on one of said end portions, and a hold recessed portion disposed axially between said sealed ring and said center projecting portion.

10. The ball bearing according to claim 7, wherein said outer ring, said inner ring and said balls are made of bearing steel.

11. The ball bearing according to claim 7, wherein the value of y is set equal to or less than 0.95.

12. The ball bearing according to claim 7, wherein the value of y is set equal to or less than 0.9.

13. The ball bearing according to claim 7, wherein said arc-shaped cross section of said inner ring raceway has a constant radius over its length.